

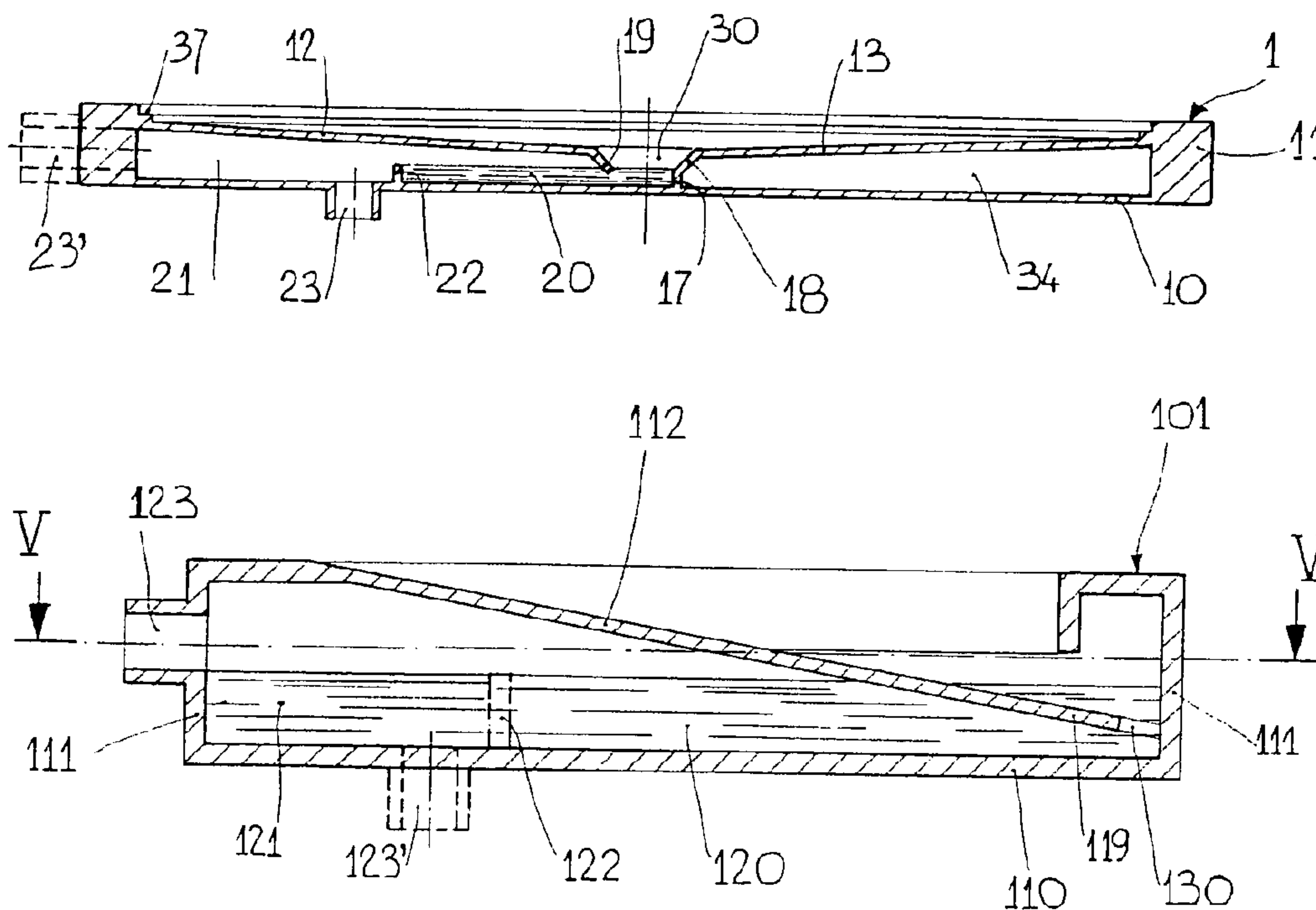


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(54) Titre : SYSTEME DE SIPHON POUVANT ETRE OBTENU DIRECTEMENT LORS DE LA FORMATION D'UN  
 ARTICLE SANITAIRE

(54) Title: SIPHON SYSTEM ATTAINABLE DIRECTLY DURING THE FORMING OF SANITARY WARE



(57) **Abrégé/Abstract:**

Siphon system attainable directly during the forming of a sanitary ware (1; 101; 201), in particular a shower tray, washbasin, bidet, water closet or any similar sanitary ware (1; 101; 201), said sanitary ware (1; 101; 201) preferably having enclosed spaces (32-36) and having partitions (12; 112; 212) already equipped with a height difference required for an inner siphon function, wherein at least one inner partition (12; 112; 212) of the sanitary ware (1; 101; 201) has its free end (19; 119; 219) constantly immersed in water, if present, between a receiving chamber (30; 130; 230) and a deposit chamber (21; 121; 221) or a drain chamber (20; 120; 220), said end (19; 119; 219) of the at least one inner partition (12; 112; 212) being arranged at a lower level with respect to a drain outlet (23'; 123; 223) in the deposit chamber (21; 121; 212) or an overflow partition (22; 122; 222) in the drain chamber (20; 120; 220), to prevent foul drain smell from spreading into a living area through the receiving chamber (30; 130; 230).

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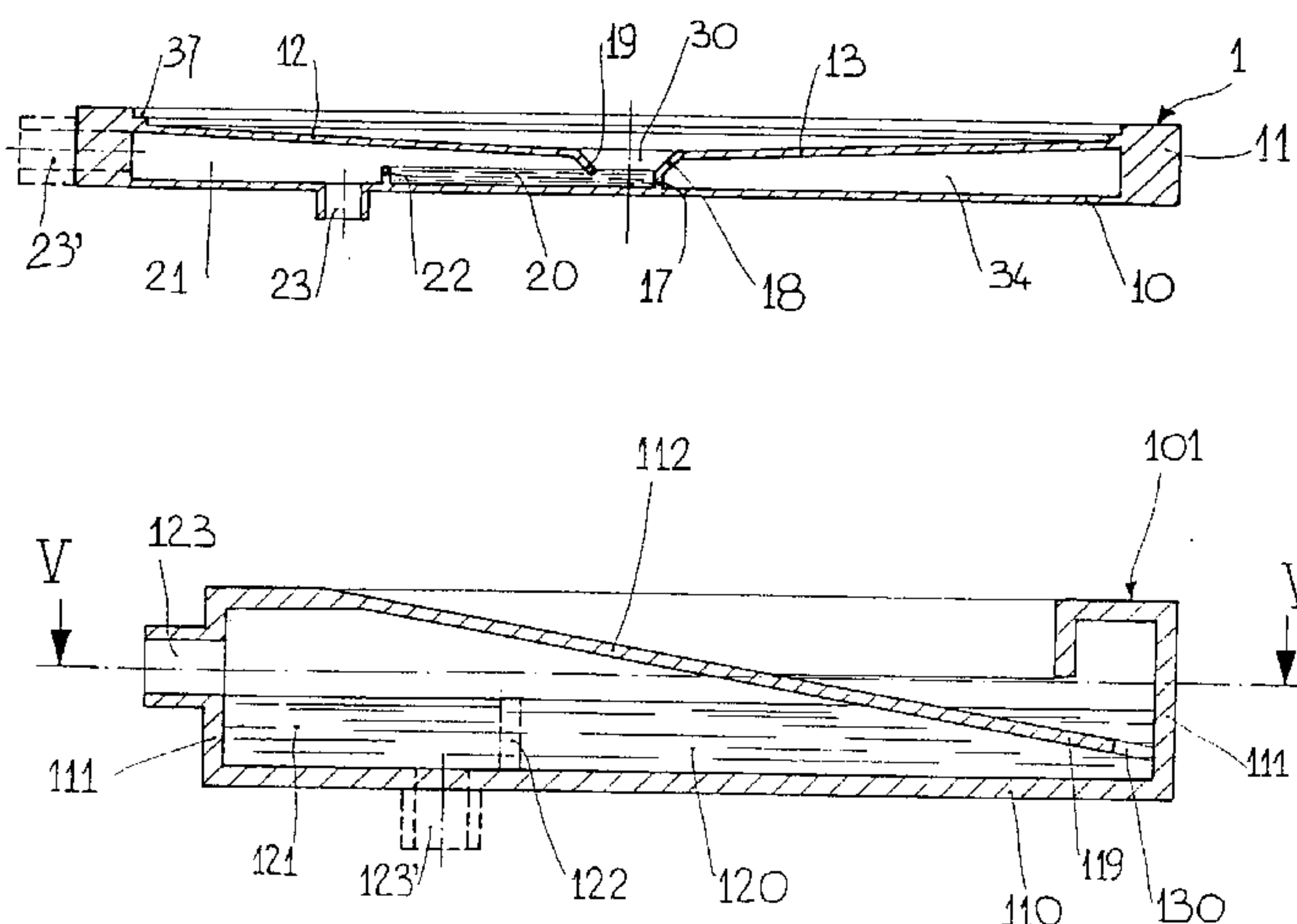
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(54) Title: SIPHON SYSTEM ATTAINABLE DIRECTLY DURING THE FORMING OF SANITARY WARE



(57) Abstract: Siphon system attainable directly during the forming of a sanitary ware (1; 101; 201), in particular a shower tray, washbasin, bidet, water closet or any similar sanitary ware (1; 101; 201), said sanitary ware (1; 101; 201) preferably having enclosed spaces (32-36) and having partitions (12; 112; 212) already equipped with a height difference required for an inner siphon function, wherein at least one inner partition (12; 112; 212) of the sanitary ware (1; 101; 201) has its free end (19; 119; 219) constantly immersed in water, if present, between a receiving chamber (30; 130; 230) and a deposit chamber (21; 121; 221) or a drain chamber (20; 120; 220), said end (19; 119; 219) of the at least one inner partition (12; 112; 212) being arranged at a lower level with respect to a drain outlet (23'; 123; 223) in the deposit chamber (21; 121; 212) or an overflow partition (22; 122; 222) in the drain chamber (20; 120; 220), to prevent foul drain smell from spreading into a living area through the receiving chamber (30; 130; 230).

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**“SIPHON SYSTEM ATTAINABLE DIRECTLY DURING THE FORMING OF  
SANITARY WARE”**

The present invention relates to a new system of formation of sanitary ware, in particular shower trays, washbasins, bidets and water closets, wherein their shape already entails the presence of interior enclosed spaces and partitions already equipped with the height difference required for the formation of their own siphon system, so that the connection of the sanitary fixtures to the sewer pipeline effectively prevents the backflow of sewer gases, removing the considerable volume of the various trap devices, which at present must be connected to the said sanitary ware during installation.

One innovative feature of the present system is to entail, during the forming of the various sanitary ware, the formation of an intermediate partition between the water receiving chamber and a deposit chamber or alternatively a drain chamber of the same sanitary ware, which partition must have an edge either lower than the level of the chamber or lower than the drain hole rim of the fixture, so that the said edge of the intermediate partition is always immersed in a minimum quantity of standing water, which, not flowing out, creates an air seal between the drain area and the receiving area, thus preventing the backflow of sewer and drain gases in the receiving chamber, thereby spreading into the living areas, in compliance with the principle of a common siphon effect.

Sanitary bowls and sanitary fixtures or wares in general are intended for receiving and temporary retaining all water used either for personal hygiene, physiological needs and house cleaning and drainage of the resulting wastewaters into the pipelines leading to the sewer line. (87)

To prevent sewer odours from seeping back into the pipes through the drain hole of each sanitary fixture, entering the bathrooms, houses or buildings in general, an established technique has entailed the interposition of a trap between the drainpipe and the sanitary fixture, that with its trap dip constantly filled with water, seals an entire lower section of the pipe, creating a barrier against the backflow of sewer gases.

Obviously, with the passing of time this technique went through several enhancements, ranging from the solution suggested in patent US 2,055,490 in 1935 to the system described with patent US 5,404,597 in 1995 or with patent EP 1 170 436 in 2001, all varying for the distinctive shapes of the trap or for the new materials employed in their manufacture, improving its shape and functionality.

DE 1 984 993 U discloses a washbasin an drain outlet and an overflow outlet meet a catch basin that is arranged under the washbasin itself and is connected with a drain conduit through a raised threshold that is arranged at a higher level with respect to the drain outlet and the overflow outlet to form a siphon.

GB 1 254 897 discloses a wash-hand basin that comprises a trap which comprises a member which is formed of the same material as, and integrally with, the basin and is divided into a descending part in an extension of the basin outlet aperture and a connected rising part by a partition; and a sleeve mounted inside the outlet aperture extension and removable through it. A drain pipe is connected to the outlet of the trap and is formed integrally with the basin and of the same material.

CA 2 337 185 discloses a urinal structure mounted on a wall and including an outlet pipe in fluid communication with the basin of the urinal for disposal of waste water from the urinal during a flushing action. A cleanout opening formed in the urinal structure in a

The same inconvenience occurs nevertheless with water closets, bidets and washbasins without pedestal and therefore mounted to the wall, where the drainpipe is also fitted, because these sanitary fixtures are at present provided with unlikely aesthetic exterior mounted drain fittings, which must be concealed by furniture due to the overall size of the trap, that must be joined to them below the drain outlet.

The most recent technology, mainly indicated for the drainage of water from bathtubs or shower trays, entails the formation of a receiving chamber, to be fitted under the sanitary fixture during installation, whose edge is higher than the drain pipe joint, where the overflowing water is received and conveyed to the grey water drain pipe, as described in patents FR 2 800 261 and DE 103 06 120.

According to these solutions, the inconvenience relating to the vertical volume of the trap is partially prevented, since the drainpipe can be basically positioned at rough floor level.

Nevertheless, the technique put forward in these patents requires a great variety of components and their uneasy installation, causing precariousness of the bearing surface and fitting problems with the joint between the drain outlet of the sanitary fixture and the sewer pipeline or grey water pipeline.

Moreover the same trap systems can only be employed where the drainpipe is very close to the main drain, contrarily an inadequate fall of the pipeline would make these systems useless.

It is an object of the present invention to provide a sanitary fixture already equipped with its own built-in siphon system, whose characteristics are to stay within limited overall dimensions and heights, which are equal or equivalent to the conventional dimensions and

heights already required in the efficiency of the current sanitary ware bearing the same function.

Within such task, a further important object of the invention is to be entirely achieved at the formation stage of the sanitary ware, without further assembly or installation of any trap device.

A further object of the present invention is, in particular, to achieve suspended and wall mounted sanitary ware, without having to cover their base with a pedestal or furniture, and in any case evading the sight of trap and drain fittings.

Another object of the present system is to be suitable for any kind of sanitary ware, allowing its formation in shallow heights, fit for the creation of new ranges of sanitary fixtures, most of all the wall mounted types.

In addition, the present system can also be employed for sanitary ware placed quite far from the main drain, provided that the concrete floor slab is high enough to allow a proper pitch of the drainpipe.

The above and other beneficial objects, better illustrated in the following description, are most effectively achieved with the present invention, which entails, at the formation stage of the various sanitary ware, the formation of an intermediate partition between the water receiving or deposit chamber and the drain chamber of the same sanitary ware; which partition must have an edge either lower than the level of the chamber or lower than the drain hole rim of the same fixture, so that the said edge of the intermediate partition is always immersed in a minimum quantity of water to be discharged, which standing water, not flowing out, seals all air ducts between the drain area and the receiving area, thus preventing the backflow of sewer and drain odours in the receiving chamber and their

escape into the living areas, in compliance with the principle of a conventional siphon action.

Further features and advantages of the innovation are explained in the following illustrative, although non-exclusive, description of its embodiment, supported by 7 schematic figures illustrated in the three annexed drawings sheets where:

- Fig. 1 is a vertical view, according to the section plan I - I of the shower tray in Fig. 3;
- Fig. 2 is a vertical view, according to the section plan II - II of the same shower tray in Fig. 3;
- Fig. 3 is a top view and a partial cross-sectional view of an example embodiment of a shower tray according to the present innovation;
- Fig. 4 is a vertical view, according to the section plan IV - IV of the washbasin or bidet in Fig. 5;
- Fig. 5 is a top view and a partial cross-sectional view of an example embodiment of a washbasin or bidet according to the present innovation;
- Fig. 6 is a vertical view, according to the section plan VI - VI of the water closet in Fig. 7;
- Fig. 7 is a top view of an example embodiment of a water closet according to the present innovation.

Each number refers to, or is supposed to refer to, the same detail in all drawings.

According to the exemplary embodiment put forward in Fig. 1 to 3, a shower tray 1 substantially comprises of a basic plane 10, for instance square-shaped, which is tied

together with an outer frame 11, that sets its dimensions, and with two upper inclined planes 12 and 13, each converging towards the mid-junction plane 14.

Between the basic plane 10 and the upper planes 12, 13 and 14 there is a series of ribs or vertical supports 15, 16 and 17, with the main function to support both inclined planes 12 and 13, determining a series of enclosed watertight spaces, indicated with numbers 32, 33, 34, 35 and 36.

As exemplified in Fig. 2, between ribs 15 and 16, the inclined plane 13 presents a slideway or additional inclination 18, which joins rib 17, while the opposite inclined plane 12 presents a slideway or additional inclination 19, having a fixed-height edge with respect to the basic plane 10, as better described hereafter, forming a channel or receiving chamber 30 of the shower water which flows in from the same inclined planes 12 and 13.

The mid section of the same rib 17, together with the left section of the orthogonal ribbings 15 and 16, as well as a section of the outer frame 11 and obviously the basic plane 10, set up a double chamber 20 – 21, which is divided by an intermediate partition 22, whose height is slightly higher than the span between the bottom 10 and the end of the slideway 19.

As a consequence of this height combination, that is, the bigger height of partition 22 with respect to the height of the span between the bottom 10 and the end of the slideway 19, the water coming from the receiving channel 30 deposits in the chamber 20, which is delimited also by partition 22 and by part of the ribbings 15, 16 and 17; such standing water can flow over the same partition 22 only by maintaining the end of the slideway 19 constantly immersed.

The drain chamber 21 is indeed provided with an outlet hole 23, which therefore receives and drains the water overflowing from the aforementioned partition 22 to convey it to the grey water pipeline.

According to what has been described so far, foul smells, seeping up from the drain pipeline to the opening 23 and the drain chamber 21, can not escape into the living area, because the layer of water standing in the deposit chamber 20, seals the passage-way from the said chamber 20 to the receiving channel 30, by constantly immersing the end of the slideway 19, thus granting the required siphon effect, with no need of common cumbersome exterior devices applied, in compliance with the main object herein specified.

The shower tray of Fig. 1 to 3 is also completed with a lower surface 37 which enables the laying, on the same shower tray 1, of a plain or grid board, allowing the strict horizontal levelling of the user's bearing surface, besides facilitating the flow of the shower water from the inclined partitions 12 and 13 to the receiving channel 30.

Referring to Fig. 2 and 3, there is shown a first variant embodiment of the shower tray 1 with the horizontal arrangement of a drain outlet 23<sup>I</sup> cut out of the outer frame 11, as illustrated for example with the dashed line.

According to this variant embodiment, the lower point of the hole rim 23<sup>I</sup> is set at a height level, with respect to the bottom 10, which is equal to the height of the above described partition 22, so that the presence of the same partition 22 becomes useless.

In fact, according to this variant embodiment, the deposit chamber 20 extends up to the rim of drain outlet 23<sup>I</sup>, nonetheless ensuring that the end of the slideway 19 is al-

ways immersed in the water of the deposit chamber 20, thus achieving the required siphon effect.

Referring to Fig. 4 and 5, as already pointed out, the same siphon system is applied in the embodiment of either a washbasin, a sink or a bidet 101, entailing the presence of a single inclined plane 112, its dimensions being smaller than those of the shower tray 1, at the same time its embodiment is easier because the above illustrated ribbings may be eliminated.

According to the example embodiment put forward in the said Fig. 4 and 5, the drain outlet 123 is cut out at one side of the outer frame 111, with the aim of further reducing the total height of the sanitary ware 101 for wall mounted use.

As already exemplified for the hole 23<sup>I</sup> of the shower tray 1, the arrangement of the drain outlet 123 at one side permits the removal of partition 122, so as to form a single siphon chamber, which includes the deposit chamber 120 and the drain chamber 121, since the lower point of such hole 123 delimits the level of the siphon water standing in the chamber 120, although it must be higher than the end 119 of the inclined plane 112 and constantly grant the presence of a sheet of water at the level of the receiving hole 130.

Obviously the same sanitary bowl 101 can be carried out, as an alternative, with the drain hole 123<sup>I</sup> arranged at the bottom 110, as exemplified with the dashed line in the same Fig. 4 and 5, complying with what has been previously described for the shower tray 1, thus entailing the formation of two chambers, a deposit chamber 120 and a drain chamber 121 with an overflow partition 122, according to the already described scheme.

Referring to Fig. 6 and 7, as already pointed out, the same siphon system is applied to a water closet 201, which, as the washbasin 101, is represented with a side or lateral drain outlet 223 of black water, for wall-mounted application.

Even in this case the level of the siphon chamber 220 – 221 is determined by the lower point of the drain hole 223, provided that such level must be higher than the height of the span or passageway between the bottom 210 and the end 219 of the inclined partition 212, in order to attain the required siphon effect.

Due to the specific utilization of a water closet and due to the mass of water employed, the height of the passageway between the bottom 210 and the end 219 will have to be adequate and in any case bigger than the height required for the exemplified washbasin 101, as well as the inclination of the partition 212.

Thereby the whole structure of the water closet 201 will have to be bigger and sturdier, yet its overall dimensions are highly reduced, due to the fact that any current exterior trap device can be eliminated, in compliance with the various objects specified.

Moreover, as seen in Fig. 6 and 7, the arrangement of the drain outlet 223<sup>1</sup> at the bottom 210 is also feasible for the water closet 201, with the ensuing need of applying a partition 222 between the deposit chamber 220 and the drain chamber 221, so as to ensure that the end 219 of the inclined partition 212 is always immersed in the water of the receiving chamber 230 and the deposit chamber 220, in compliance with the siphon scheme so far described.

Always referring to the same Fig. 6 and 7, there is shown that on the side surface 211, together with the drain outlet 223, a supply inlet 240 is provided for flushing wa-

ter, with its own distribution chamber 241 and with outlet holes 242, in compliance with any system of flushing water distribution.

On the base of what has been described so far, there is shown that indeed by means of the system with inclined partition 12, 112, 212, which has the lower end 19, 119, 219 constantly immersed in a chamber of standing water 20, 120, 220, determining a level of the receiving channel 30, 130, 230 always higher than the said end 19, 119, 219, a siphon effect can be achieved for shower trays, washbasins, sinks, bidets and water closets or other similar sanitary fixtures, eliminating the impractical overall size of the various trap devices, which at present must be fixed at the exterior of such sanitary ware, with a considerable advantage in terms of space and installation time, according to some of the specified objects.

In addition, the same technique put forward herein, allows an easier formation of suspended sanitary ware for a better hygiene of the bathroom, as well as the creation of new allied product ranges and their positioning even far away from the main drain, providing that there is enough space to grant a proper pipe pitch, in compliance with some other objects indicated.

The embodiment of the system so far described, for the various types of sanitary ware exemplified, is achievable thanks to a new forming technique of the same sanitary fixtures, which replaces the traditional method of forming through the moulding of ceramic materials.

This new technique consists basically in the tooling and shaping of the various aforesaid parts of each sanitary fixture, namely the bottom, the side partitions, the inclined partitions, etc., cut out of slabs or various profiles of special resins like Corian<sup>®</sup> and

then in their positioning and fixing, by means of proper adhesives, according to an established technique, well-known in various fields of use, that in this field enables the embodiment of a siphon system for the sanitary fixtures achieved according to the aforesaid specifications, which is absolutely innovative and original.

As previously specified, the embodiment of the siphon system of sanitary ware so far illustrated is meant as merely exemplifying and non-limitative, not only for the possibility of variation in relation to the arrangement of the drain outlet 23, 123, 223 either at the bottom 10, 110, 210 or on the side surface 11, 111, 211, but also for further possible embodiments in relation to the shape of the various sanitary ware 10, 110, 210.

By way of example, it will be apparent that the additional inclination of the ends 18 and 19 of the shower tray 1 can be eliminated by maintaining a sole and adequate inclination of the partitions 12 and 13, nevertheless apt to form a receiving chamber 30, at the same time supplementary inclinations are likely to be achieved at the ends 119 and 219 of the inclined partitions 112 and 212 of the above exemplified sanitary fixtures 101 or 201.

Likewise, the inclined ends 18 and 19 of the planes 12 and 13 can be orthogonal with respect to the same planes 12 and 13 or with respect to the bottom 10, moreover the blind areas or those points not reached by the water 32, 33, 34, 35 and 36 can vary in number according to the variation of the ribs 15 and 16 or equivalent points of support of the inclined planes 12 and 13, in addition the said areas can be filled or padded, for example, with a suitable polyurethane foam or equivalent material.

Thus, a board can be laid directly on the inclined planes 12 and 13 of the shower tray 1, in addition an horizontal plane can be laid directly on the inclined plane 112 of the

fixture 101, provided that the said boards are equipped with inclined feet apt to ensure the horizontal levelling, preventing an unsanitary surfacing of standing water.

Shower trays 1 can also be attained with watertight chambers 32, 33, 34, 35 and 36 either bottomless 10 or with a pierced bottom 10, for example, for embedding in the concrete floor slab where they should be anchored; at the same time shower trays 1 can also be achieved with a single inclined plane extending over the whole shower tray, providing that the end 19 is immersed in the deposit chamber 20 placed below.

In addition, the inclined partitions 112 and 212 of the sanitary fixtures 101 and 201 can be provided with a different inclination, even upright, in respect to the level of standing water in which they are immersed, and associated to feasible planes to which they can be hinged horizontally, to conceal the standing water and to grant major volumes of use of the fixture, like for example, kitchen sinks, at the same time the inclined partition 112 can be differently shaped, in order to increase the free volume at disposal of the basin, always providing that the ends 119 are immersed and enclosed between the receiving chamber 130 and the deposit chamber 120 of wastewater.

These and other similar modifications or adjustments are anyhow meant as included in the originality of the system claimed herein.

## AMENDED CLAIMS

(87)

1. A sanitary ware (1; 101; 201) comprising a siphon system, said sanitary ware comprising an outer frame (11; 111; 211), at least one inclined partition (12; 112; 212), a receiving channel (30; 130; 230), a siphon chamber (20, 21; 120, 121; 220, 221), a drain outlet (23'; 123; 223) arranged at a side of said siphon chamber (20, 21; 120, 121; 220, 221), said siphon chamber (20, 21; 120, 121; 220, 221) communicating both with said receiving channel (30; 130; 230) and said drain outlet (23'; 123, 223), characterized in that said siphon chamber (20, 21; 120, 121; 220, 221) has a horizontal bottom (10; 110; 210) and that an end (19; 119; 219) of said inclined partition (12; 112; 212) is spaced from said bottom (10; 110; 210) by a distance that is smaller than a distance between a lowest point of said drain outlet (23'; 123; 223) and said bottom (10; 110; 210).

2. A sanitary ware (1; 101; 201) comprising a siphon system, said sanitary ware comprising an outer frame (11; 111; 211), at least one inclined partition (12; 112; 212), a receiving channel (30; 130; 230), a siphon chamber (20, 21; 120, 121; 220, 221), a drain outlet (23; 123'; 223') arranged at a bottom (10; 110; 210) of said siphon chamber (20, 21; 120, 121; 220, 221), said siphon chamber (20, 21; 120, 121; 220, 221) communicating both with said receiving channel (30; 130; 230) and said drain outlet (23; 123', 223'), characterized in that said bottom (10; 110; 210) is a horizontal bottom (10; 110; 210), an intermediate partition (22; 122; 222) dividing said siphon chamber (20, 21; 120, 121; 220, 221) into a deposit chamber (20; 120; 220) and a drain chamber (21; 121; 221) communicating with each other, said deposit chamber (20; 120; 220) communicating with said receiving channel (30; 130; 230), said drain chamber (21; 121; 221) communicating with said drain outlet (23; 123'; 223'), an end (19; 119; 219) of said inclined partition (12; 112; 212) being spaced from said bottom (10; 110; 210) by a distance that is lower than a height of said intermediate partition (22; 122; 222).

3. A sanitary ware (1) according to claim 1, or 2, wherein said sanitary ware is a shower tray, said shower tray comprising two inclined partitions (12; 13) having respective ends (18; 19) forming said receiving channel (30).

4. A sanitary ware (1) according to claim 3, wherein said two inclined partitions (12; 13) are supported by ribs (15; 16; 17).

5. A sanitary ware (1) according to claim 4, wherein said ribs (15; 16; 17) delimit said

siphon chamber (20; 21).

6. A sanitary ware (1) according to claim 4, or 5, wherein said ribs (15, 16, 17) delimit a series of watertight chambers (32, 33, 34, 35, 36).

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7. A sanitary ware (1) according to claim 6, wherein said watertight chambers are bottomless or have a pierced bottom.

8. A sanitary ware (101) according to claim 1, or 2, wherein said sanitary ware is a washbasin, a sink or a bidet.

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9. A sanitary ware (201) according to claim 1, or 2, wherein said sanitary ware is a water closet.

10. A sanitary ware (201) according to claim 9, wherein said water closet includes a flushing water supply system (240) and distribution system (241).

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11. A sanitary ware (101; 201) according to one of claims 8 to 10, wherein said at least one inclined partition forms an inclined (112; 212) plane connected to an upper edge (111; 211) of the sanitary ware.

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12. A sanitary ware (101; 201) according to claim 11, wherein said inclined plane (112; 212) can have different inclination angles and different shapes depending on the volume to be left free in the sanitary ware.

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13. A sanitary ware (1; 101; 201) according to one of preceding claims, wherein said siphon system is obtained during the formation of the sanitary ware (1; 101; 201).

14. A sanitary ware (1; 101; 201) according to one of preceding claims wherein said siphon chamber (20, 21; 120, 121; 220, 221), said deposit chamber (20; 120; 220), said drain chamber (21; 121; 221) and said intermediate partition (22; 122; 222) are formed integrally with said outer frame (11; 111; 211).

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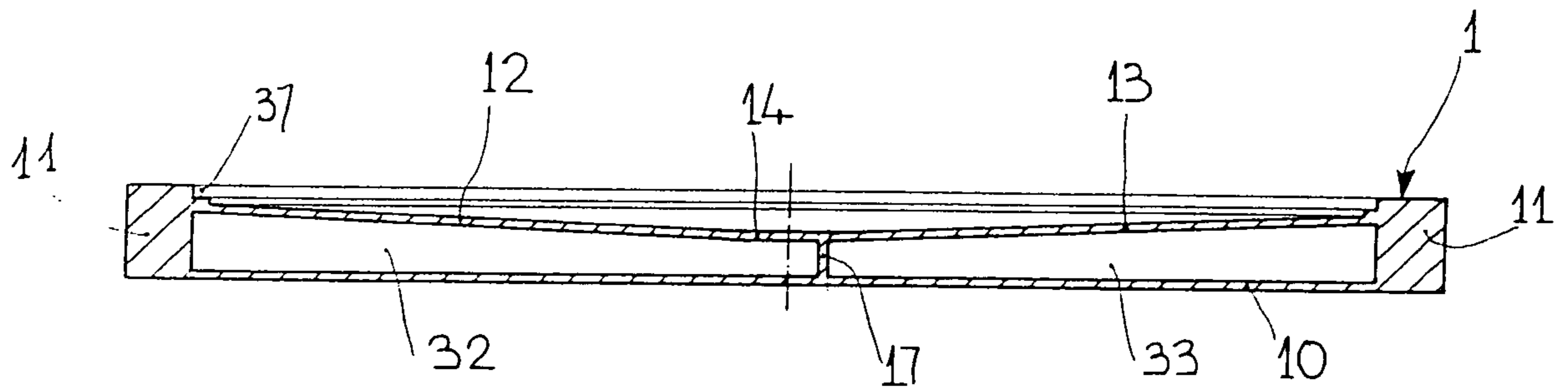


Fig. 1

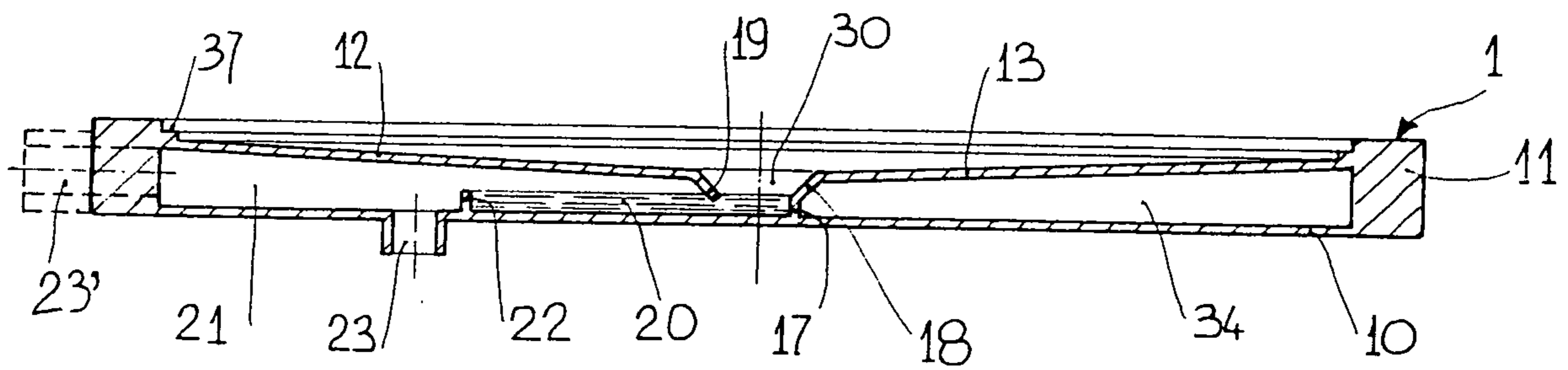


Fig. 2

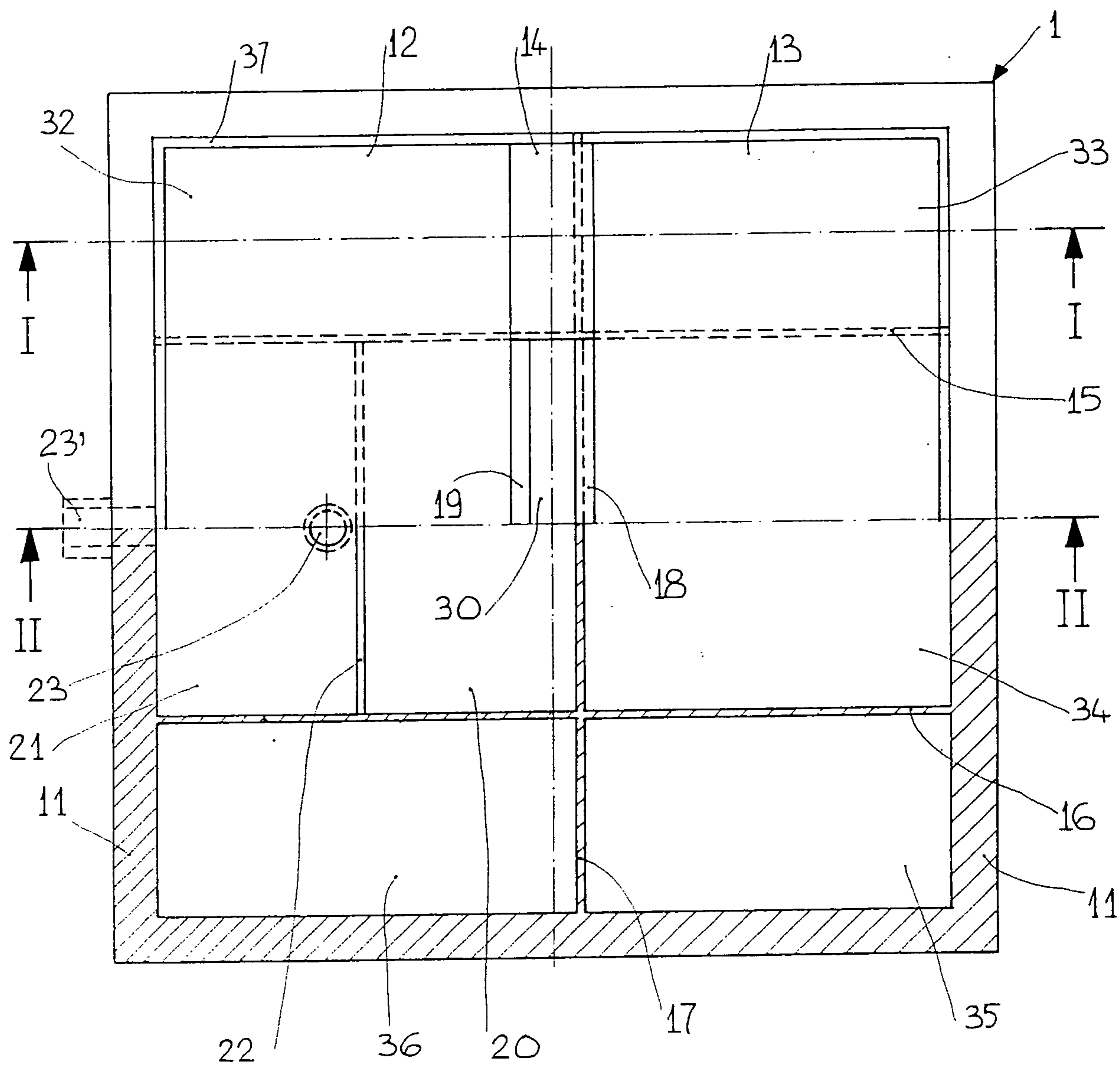


Fig. 3

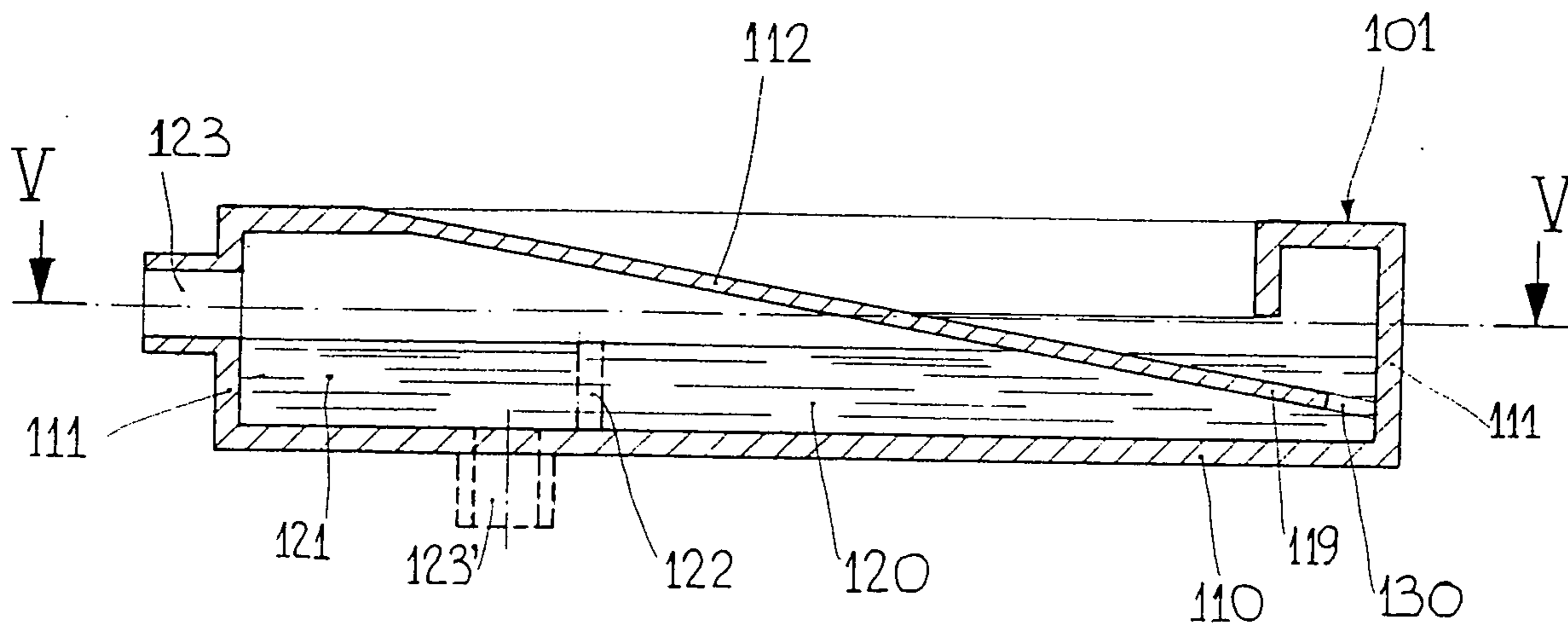


Fig. 4

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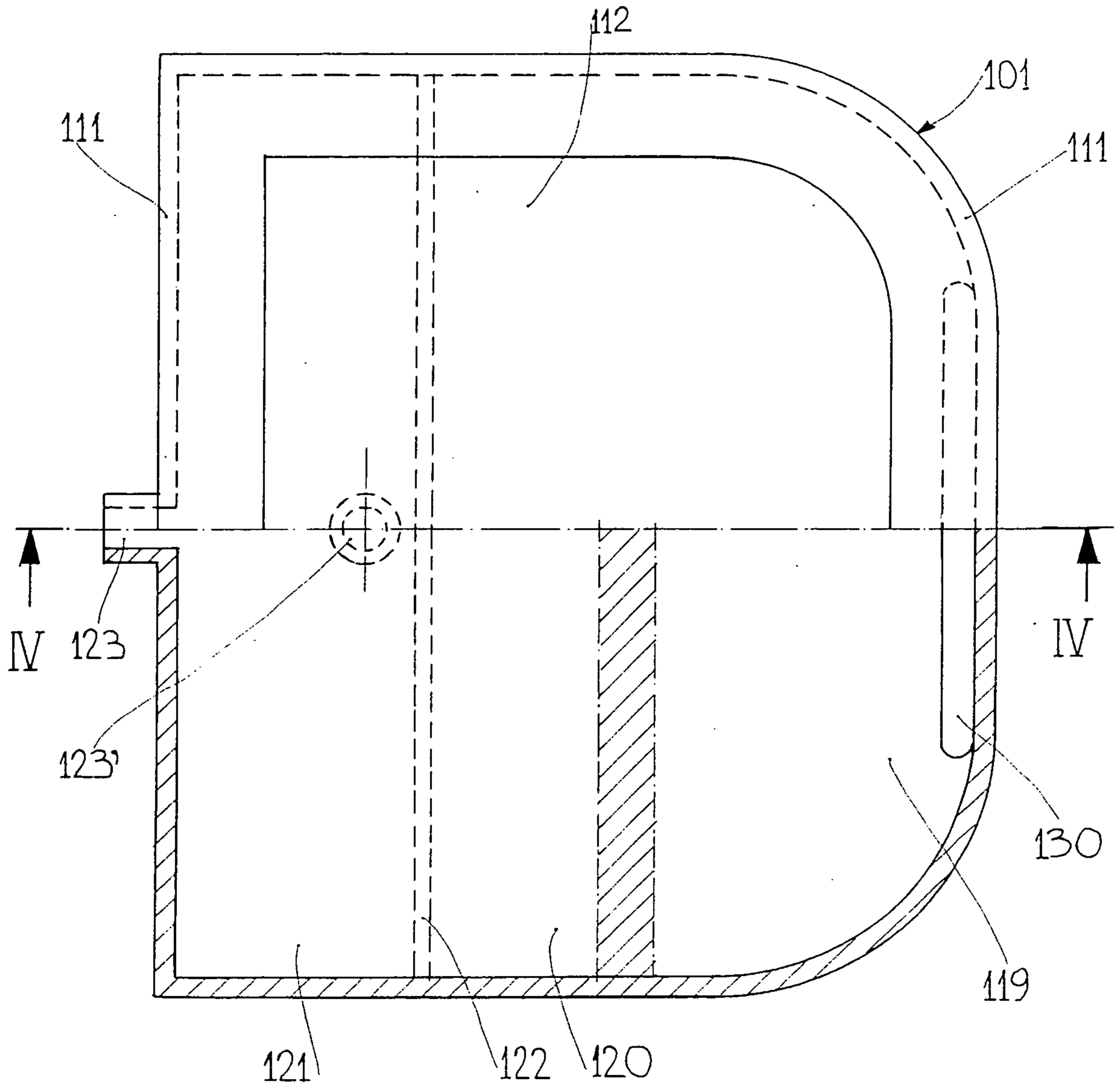


Fig. 5

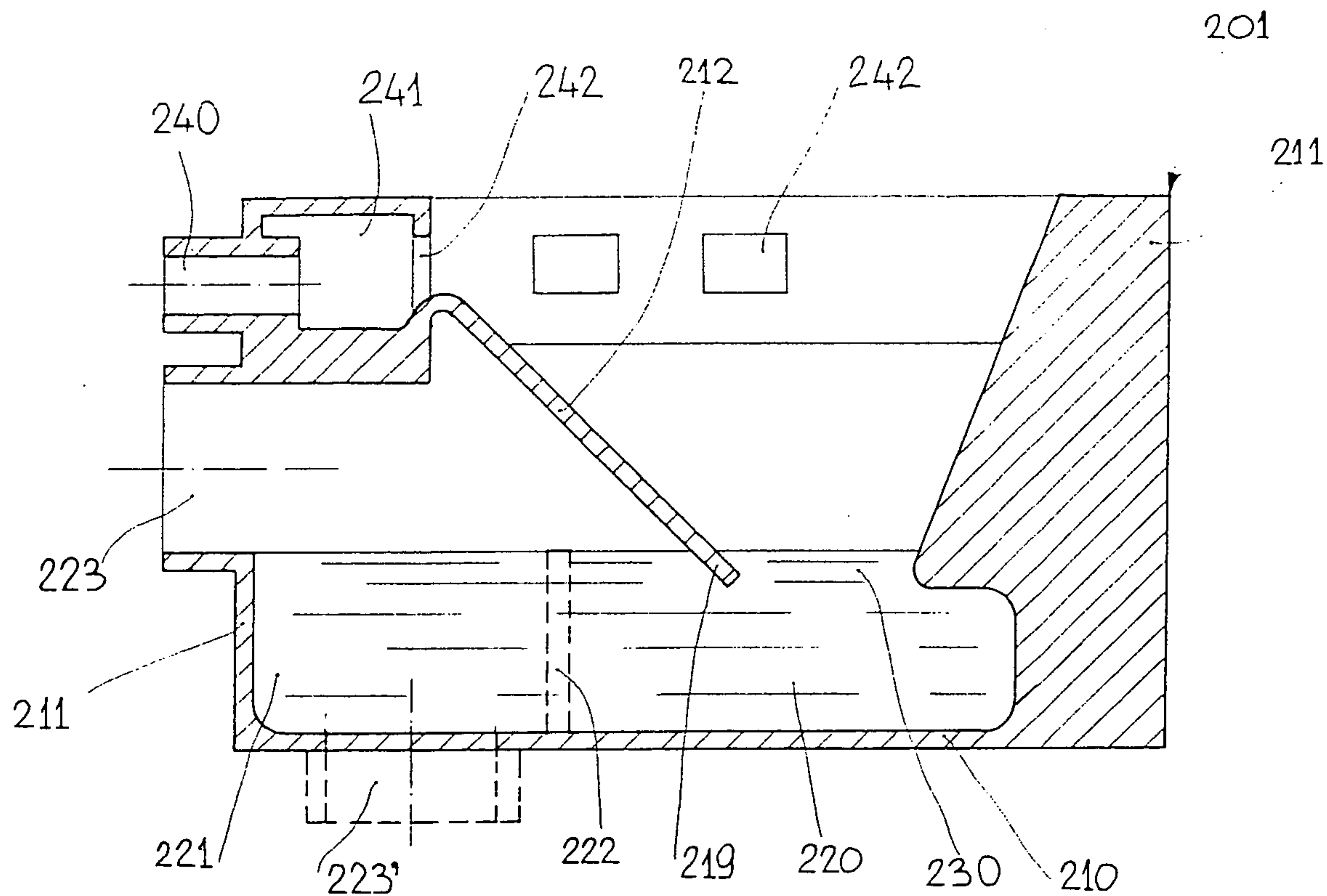


Fig. 6

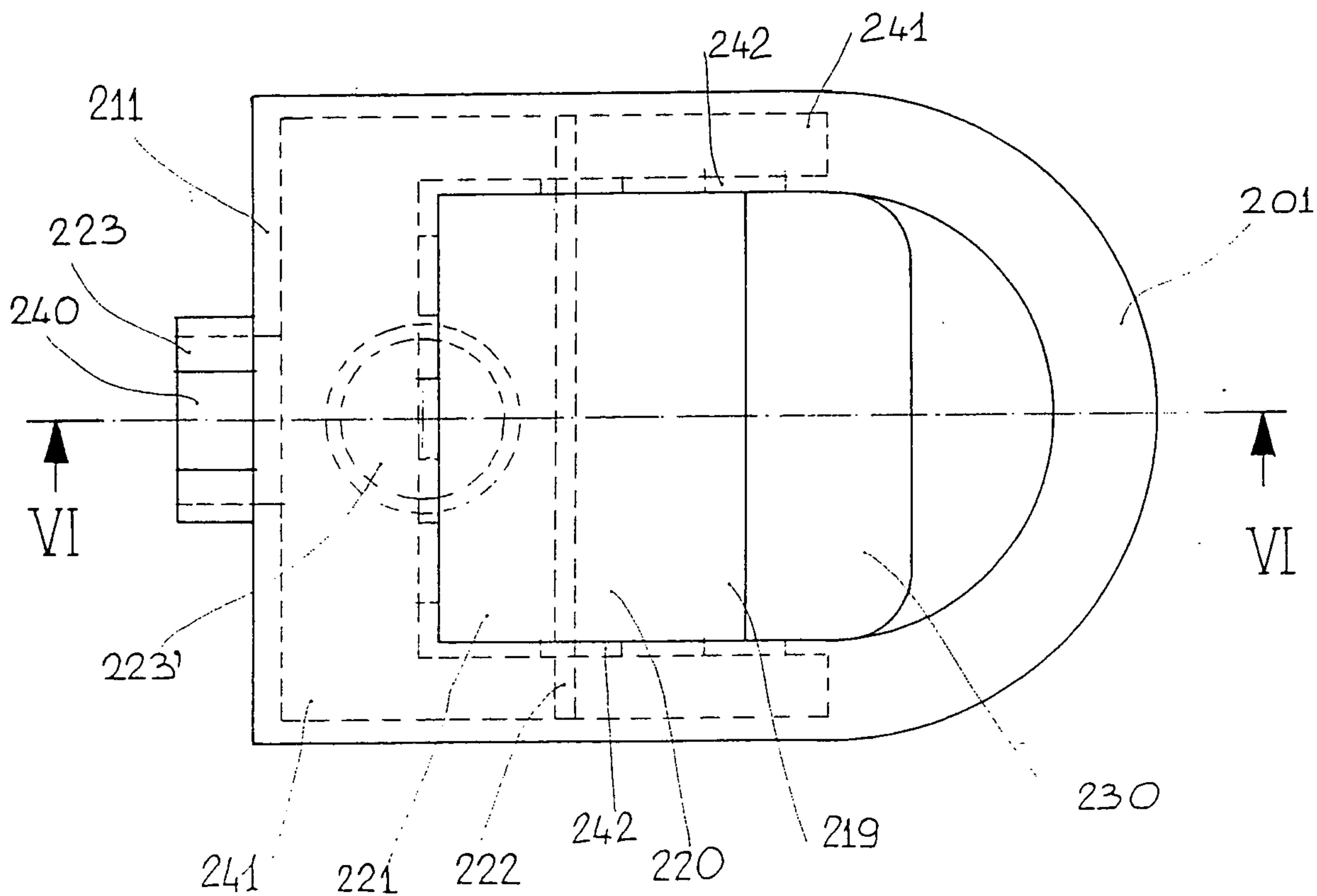


Fig. 7

